

REMARKS

Applicants wish to thank Examiner Wartalowicz for the courteous and helpful telephone interview conducted with Applicants' representative on September 21, 2009. As a follow-up to the interview, claims 9, 10, 21, 22 and 25 have been amended. Support for the amended claims can be found in the original disclosure, including at least paragraphs 84-88, 96 and 97. Please note that claims 9 and 10 as amended are broader in certain respects, and more limited in other respects, than they were previously. Applicants reserve the right to pursue the original and other claims in this and in other applications.

Claims 16, 17, 22 and 24 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Applicants respectfully request the rejection be withdrawn. Applicants have amended claim 22 to remove the language cited by the Office Action as unclear.

The present invention relates to, though it is not limited to, the wires shown in Figs. 1A and 2, where a superconductor material 5 is surrounded by a tubular-shaped metal cladding layer and a coaxial metal base member. At least one of the cladding layer and the base member has an electric resistance of $7\ \mu\Omega$ or less at room temperature, and the other includes iron and has a Vickers hardness of at least 50 at room temperature. An intermediate layer 4 operates as a junction auxiliary material between the cladding layer and the base member, and is electrically and mechanically unified and integrated therewith. The cladding layer and the base member may be formed, for example, of copper and iron. The tensile strengths of copper and iron are remarkably different, and, as a result, the wire would tend to be broken if it did not have the junction auxiliary material. Thus, in a preferred embodiment of the invention, the junction auxiliary material improves adhesion characteristics between the metals, and it becomes possible to make the length of wire extendible without being broken. Please refer, for example, to the specification ¶ 0090.

Claims 9, 10, 12, 14, 15, 17 and 19-22 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Thieme in view of Yamada and Meyer. Applicants respectfully traverse the rejection.

Claim 9, as amended, recites a metal cladding layer and a metal base member, at least one of which “includes iron,” and an intermediate layer. The Office Action relies on Meyer, specifically its copper oxide layer 5, to meet the “intermediate layer.” The heat treatment mentioned in Meyer at column 6, lines 40-57, involves a copper tube (column 6, line 6). The copper oxide layer 5 is formed from the copper tube 1. Meyer does not disclose or suggest the use of iron, and, if the copper tube 1 were somehow made of iron, then it would not produce the copper oxide layer 5.

Thieme and Yamada are relied upon in the Office Action for other aspects of the invention. Thus, the prior art references, even when considered together, do not disclose or suggest the superconducting wire of claim 9, as amended, wherein one of a metal cladding layer and a metal base member includes iron, and wherein an intermediate layer operates as a junction auxiliary material. Claims 10-12, 14-17 and 19-26 (all of the other pending claims) recite the limitations discussed above in connection with claim 9, and therefore should be allowable over the prior art for similar reasons.

The purpose of Meyer’s copper oxide layer 5 (and a layer 6 formed of other metals) is to provide a diffusion barrier to suppress migration of oxygen from the core material (column 3, lines 15-18 and 24-27). Meyer refers to a compound sheath with Cu/Ag, i.e., a compound sheath including Cu and Ag as shown in Fig. 2, a compound sheath Cu/CuO/Ag shown in Fig. 3, and a compound sheath including Cu/Nb (barrier layer)/Ag shown in Fig. 4. In each arrangement, since there is no junction auxiliary material, a Cu/Fe sheath cannot be employed. As noted above, the tensile strengths of Cu and Fe are remarkably different such that a wire without a junction auxiliary material tends to be broken. The advantageous junction auxiliary material of Applicants’ claimed invention is not disclosed or suggested by Meyer.

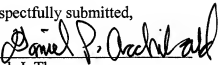
Moreover, please note that claims 10-12, 14-17 and 19-26 have been further amended to clarify that the base member and the cladding layer are drawn together, and that the junction auxiliary layer operates to avoid formation of a gap between the base member and the cladding layer during such drawing. These amendments, which were prompted by comments made by the Examiner during the interview, when considered in combination with the other recited limitations, make the claims even more clearly distinguishable over the prior art references.

In view of the above, Applicants believe the pending application is in condition for allowance.

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Respectfully submitted,

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